

Case 3175***Ampullaria canaliculata* Lamarck, 1822 (currently *Pomacea canaliculata*; Mollusca, Gastropoda): proposed conservation of the specific name**

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Abstract. The purpose of this application is to conserve the well known and used specific name of *Ampullaria canaliculata* Lamarck, 1822 (currently known as *Pomacea canaliculata*, family AMPULLARIIDAE) for a species of freshwater gastropod. The name has been used for the taxon for nearly 180 years but is a junior primary homonym of *Ampullaria canaliculata* Lamarck, 1804 (currently known as *Natica* or *Amauropsina canaliculata*, family NATICIDAE or AMPULLOSPIRIDAE), the name for an Eocene marine species from Europe. The species have not been considered congeneric since 1832. *Pomacea canaliculata* (Lamarck, 1822) is a major pest species of rice and taro, originally from South America but spreading in North America and introduced in south-east Asia and islands in the Pacific.

Keywords. Nomenclature; taxonomy; *Natica canaliculata*; *Amauropsina canaliculata*; *Pomacea canaliculata*; Gastropoda; NATICIDAE; AMPULLOSPIRIDAE; AMPULLARIIDAE; Eocene; Recent; apple snails; pest species.

1. Lamarck (1804, p. 32) described a new gastropod species, *Ampullaria canaliculata*, as a fossil shell from Grignon in the environs of Paris, France. His description was based on shells from his own collection (now in Geneva) and the collection of Defrance (formerly in the Musée d'Histoire Naturelle de Caen); the Defrance specimens are now missing (see Bigot, 1907, p. 87). There are six syntypes of this species from the Lutetien (middle Eocene) marine deposits at Grignon, in the Département de Géologie et de Paléontologie at the Muséum d'Histoire Naturelle, Genève (MHNG) (Decrouez, 1993, p. 318).

2. Subsequently, Lamarck (1822a, p. 178) introduced *Ampullaria canaliculata* for a Recent species from 'La Guadeloupe'. This Caribbean island type locality may be in error (Hylton Scott, 1958; Thiengo, Borda & Araújo, 1993) as the species appears to be endemic from temperate Argentina northwards to Brazil and does not occur naturally in Guadeloupe or elsewhere in the Caribbean (see, for example, Pointier, 1975). The presumed type specimen of this species is also in the MHNG (Département des Invertébrés) and was discussed and figured by Mermod (1952, pp. 88–89, fig. 149); it is a freshwater ampullariid.

3. Lamarck (1822b, p. 180) noted that many of the species he described in Lamarck (1822a) belonged to the same genus as the fossil species he had previously described from Grignon in his 1804 work, although he did not explicitly state whether the two descriptions of *canaliculata* referred to a single species. If he had considered them to be the same species the 1822 name represents a misidentification. Because Lamarck (1822a) did not explicitly state that the two descriptions referred to the same species, it seems parsimonious to conclude that he inadvertently described two species with the same name. Additional support for this interpretation comes from Lamarck himself (1822b, p. 549). In this work he introduced the name *Ampullaria canalifera* with a condensed version of the 1804 description of *canaliculata* and listed *canaliculata* Lamarck, 1804 as a synonym. The 1822 work treated the same 12 fossil species of *Ampullaria* as did the 1804 work, and in the same sequence, the only difference in the names being that *canaliculata* in the 1804 work was replaced with *canalifera* in the 1822 work. It seems likely that Lamarck had noticed the homonymy and replaced *canaliculata* 1804 with *canalifera*. His reason for replacing the senior synonym rather than the junior remains unknown. Deshayes & Milne Edwards (1838, p. 534) restated the description of *Ampullaria canaliculata* Lamarck, 1822 and (p. 552) listed *canaliculata* Lamarck, 1804 as a synonym of *Ampullaria canalifera* Lamarck, 1822, stating that it was a fossil from France. Kabat (1991, p. 419) outlined the history of confusion by Lamarck and others of fossil naticoids (marine taxa) with the freshwater ampullariids.

4. Deshayes (1832, p. 170) subsequently transferred *Ampullaria canaliculata* Lamarck, 1804 to *Natica Scopoli*, 1777, a genus in the family NATICIDAE. Many of Lamarck's fossil naticoids are the type species of various genera. *Ampullaria canaliculata* Lamarck, 1804 is the type species of *Amauropsina* Chelot, 1885 (p. 203) by original designation (see Kabat, 1991, p. 426). *Amauropsina* has been classified in the NATICIDAE by most authors, but was recently transferred, without explanation, to the AMPULLOSPIRIDAE by Tracey et al. (1996, p. 116). Although never frequently cited in the literature, *canaliculata* Lamarck, 1804 does appear particularly in the classical works dealing with the deposits in which it occurs, as well as in type catalogues, generic compilations and stratigraphic checklists. A syntype of *canaliculata* Lamarck, 1804 was figured by Favre (1918, pl. 4, figs. 50–53) in his type catalogue of the Lamarckian fossils, and Palmer (1977, p. 170) reproduced Lamarck's hitherto unpublished figure of the species. The remaining citations to *canaliculata* Lamarck, 1804 since 1900, as known to us, are Cossmann (1902, p. 16), Cossmann & Pissarro (1902, p. 87, pl. 21, fig. 34), Cossmann & Peyrot (1919, pp. 188–189, fig. 52), Cossmann (1925, pp. 124–125, pl. 3, figs. 3–4), Glibert (1933, pp. 33–34, pl. 2, fig. 3), Wenz (1941, p. 1036, fig. 2968), Glibert (1963, pp. 93–94), Berset & Decrouez (1990, p. 227), Le Renard & Pacaud (1995, p. 95), Pacaud & Le Renard (1995, p. 164) and Tracey et al. (1996, p. 116).

5. The specific name of *Ampullaria canaliculata* Lamarck, 1822 has a considerable record of usage in both the classical and modern literature and in both the taxonomic and non-taxonomic literature. Originally a South American species, it has been introduced to South-east Asia where during the past two decades it has become a major pest of rice (Cowie, in press). It has also been introduced to islands of the Pacific, where it has become a serious pest of taro (Cowie, 1995, 2000). It has been reported from continental U.S.A. in Texas (Neck, 1987), Florida (Thompson, 1997)

and California (Cerutti, 1998), and it is considered a major threat to Australian rice-growing and wetland areas as well as to as yet uninfested regions of southern Asia (Baker, 1998). An immense literature, both in widely accessible peer-reviewed scientific journals and books and in the more obscure literature of agency reports, newsletters, conference proceedings and other publications has proliferated, particularly in the last 20 years. The following list of publications constitutes a representative sample, reflecting in part the rapid spread and increased economic significance of this species as a major crop pest since about 1980: Mochida, 1988; Berthold, 1991; Halwart, 1994; Estebenet, 1995; Albrecht, Carreño & Castro-Vazquez, 1996; Naylor, 1996; Perera & Walls, 1996; Vitousek, D'Antonio, Loope & Westbrooks, 1996; Wada, 1997; and Lach, Britton, Rundell & Cowie, in press. In addition to the works cited in this application, 17 further references by 36 authors and dating from 1965 to 1999 which demonstrate the usage of the name *canaliculata* Lamarck, 1822 are held by the Commission Secretariat. Numerous earlier books and major taxonomic treatments also deal with *canaliculata* Lamarck, 1822 (see, for example, Philippi, 1851; Reeve, 1856–1858; Sowerby, 1909; Kobelt, 1913; Alderson, 1925).

6. The homonymy between *Ampullaria canaliculata* Lamarck, 1804 and *A. canaliculata* Lamarck, 1822 could be resolved by replacing the junior homonym with a name from among its synonymies. However, the taxonomy of the group of species to which *Pomacea canaliculata* (Lamarck, 1822) belongs is currently unresolved (Cowie, in press) and requires extensive research. Many names have been suggested by various authors as junior synonyms of *canaliculata* Lamarck, 1822, the earliest of which seem to be *A. lineata* Spix, 1827, *A. australis* d'Orbigny, 1835 and *A. insularum* d'Orbigny, 1835 (see, for example, Hylton Scott, 1958; Thiengo et al., 1993). However, these names have been used by other authors as names for valid taxa. Among the few major revisions of this species group, the most recent being that of Alderson (1925), there are none that would permit the definitive selection of a junior synonym as a substitute name. Further, given the immense literature dealing with this species (see para. 5 above), great and unnecessary confusion would be generated.

7. Alternatively, the homonymy could be removed by suppressing the older name, *canaliculata* Lamarck, 1804, and replacing it with a name from its synonymy. The oldest synonym that can be applied is *canalifera* Lamarck, 1822 (para. 3 above). The only use of this name in the 20th century known to us is in the type catalogue by Decrouez (1993). Both the generic and specific names of *Amauropsina canaliculata* have been cited in the literature since Chelot's (1885) description of *Amauropsina* and his selection of *canaliculata* as the type species.

8. As noted above, the specific name of *Ampullaria canaliculata* Lamarck, 1822 is a junior primary homonym of *A. canaliculata* Lamarck, 1804. However, the species have not been included in the same genus since 1832 when Deshayes transferred the latter to *Natica* Scopoli, 1777, and neither is now included in the original genus. *Ampullaria canaliculata* Lamarck, 1804 is now placed in *Natica* or in *Amauropsina* Chelot, 1885 and, following Opinion 1913 (March 1999), the valid genus for *A. canaliculata* Lamarck, 1822 is *Pomacea* Perry, 1810. Indeed, the two species are currently included in different families: *canaliculata* (1804) in the NATICIDAE or AMPULLOSPIRIDAE and *canaliculata* (1822) in the AMPULLARIIDAE. To avoid the confusion that would result from upsetting the long-established usage of either name, and in the interests of nomenclatural stability, we propose that both names be

maintained. We also propose that the specific name of *A. canalifera* Lamarck, 1822 be placed on the Official Index as an unused junior objective synonym (replacement name) of *A. canaliculata* Lamarck, 1804.

9. Article 23.9.5 of the Code records that 'When an author discovers that a species-group name in use is a junior primary homonym of another species-group name also in use, but the names apply to taxa not considered congeneric after 1899, the author must not automatically replace the junior homonym; the case should be referred to the Commission for a ruling under the plenary power and meanwhile prevailing usage of both names is to be maintained'.

10. The International Commission on Zoological Nomenclature is accordingly asked:

- (1) to use its plenary power to rule that the specific name *canaliculata* Lamarck, 1822, as published in the binomen *Ampullaria canaliculata*, is not invalid by reason of being a junior primary homonym of *Ampullaria canaliculata* Lamarck, 1804;
- (2) to place on the Official List of Generic Names in Zoology the name *Amauropsina* Chelot, 1885 (gender: feminine), type species by original designation *Ampullaria canaliculata* Lamarck, 1804;
- (3) to place on the Official List of Specific Names in Zoology the following names:
 - (a) *canaliculata* Lamarck, 1804, as published in the binomen *Ampullaria canaliculata* (specific name of the type species of *Amauropsina* Chelot, 1885);
 - (b) *canaliculata* Lamarck, 1822, as published in the binomen *Ampullaria canaliculata* (not invalid by the ruling in (1) above);
- (4) to place on the Official Index of Rejected and Invalid Specific Names in Zoology the name *canalifera* Lamarck, 1822, as published in the binomen *Ampullaria canalifera* (a junior objective synonym of *Ampullaria canaliculata* Lamarck, 1804).

Acknowledgements

We thank Virginie Héros and Pierre Lozouet (*Muséum National d'Histoire Naturelle, Paris*) and Yves Finet (*Museum d'Histoire Naturelle, Genève*) for assistance with literature. Philippe Bouchet, Pierre Lozouet and Jacques LeRenard made valuable and detailed comments on the manuscript.

References

- Albrecht, E.A., Carreño, N.B. & Castro-Vazquez, A. 1996. A quantitative study of copulation and spawning in the South American apple-snail, *Pomacea canaliculata* (Prosobranchia: Ampullariidae). *The Veliger*, 39: 142–147.
- Alderson, E.G. 1925. *Studies in Ampullaria*. xx, 102 pp., 19 pls. Heffer, Cambridge.
- Baker, G.H. 1998. The golden apple snail, *Pomacea canaliculata* (Lamarck) (Mollusca: Ampullariidae), a potential invader of fresh water habitats in Australia. Pp. 21–26, in Zalucki, M.P., Drew, R.A.I. & White, G.G. (Eds.), *Pest management — future challenges. Proceedings of the sixth Australasian applied entomological research conference. Brisbane, Australia. 29 September–2 October 1998*, vol. 2. University of Queensland Printery, Brisbane.
- Berset, S. & Decrouez, D. 1990. Les collections du département de géologie et de paléontologie des invertébrés du muséum d'histoire naturelle de Genève — 38. La collection Delessert. *Revue de Paléobiologie*, 9(1): 215–242.

- Berthold, T.** 1991. Vergleichende Anatomie, Phylogenie und historische Biogeographie der Ampullariidae (Mollusca, Gastropoda). *Abhandlungen des Naturwissenschaftlichen Vereins in Hamburg (NF)*, **29**: 1–256.
- Bigot, A.** 1907. Catalogue critique de la collection Defrance, conservée au Musée d'Histoire Naturelle de Caen. Quatrième partie: Gastéropodes décrits et figurés par Lamarck d'après des échantillons de cette collection. *Bulletin de la Société Linnéenne de Normandie*, (5)**10**: 81–135.
- Cerutti, R.** 1998. An infestation of *Pomacea canaliculata* (Lamarck, 1804) in Lake Miramar, San Diego, California. *The Festivus*, **30**(2): 25–27, 29.
- Chelot, E.** 1885. Rectifications pour servir à l'étude de la faune éocène du bassin de Paris. *Bulletin de la Société Géologique de France*, (3)**13**(2): 191–203.
- Cossmann, M.** 1902. Mollusques éocéniques de la Loire-Inférieure, tome 2(2). *Bulletin de la Société des Sciences Naturelles de l'Ouest de la France*, (2)**2**(1): 5–159.
- Cossmann, M.** 1925. *Essais de paléoconchologie comparée*, vol. 13. 345 pp., 11 pls.
- Cossmann, M. & Peyrot, A.** 1919. Conchologie néogénique de l'Aquitaine. *Actes de la Société Linnéenne de Bordeaux*, **70**: 181–356.
- Cossmann, M. & Pissarro, G.** 1902. Faune éocénique du Cotentin (mollusques), 3e Article (1). *Bulletin de la Société Géologique de Normandie*, **21**: 27–181.
- Cowie, R.H.** 1995. Identity, distribution and impacts of introduced Ampullariidae and Viviparidae in the Hawaiian Islands. *Journal of Medical and Applied Malacology*, **5**: 61–67.
- Cowie, R.H.** 1997. Catalog and bibliography of the non-indigenous nonmarine snails and slugs of the Hawaiian Islands. *Bishop Museum Occasional Papers*, **50**: 1–66.
- Cowie, R.H.** 2000. *Non-indigenous land and freshwater molluscs in the islands of the Pacific: conservation impacts and threats*. South Pacific Regional Environment Programme Technical Report. Apia, Samoa.
- Cowie, R.H.** In press. Apple snails as agricultural pests: their biology, impacts and management. In Baker, G.M. (Ed.), *Molluscs as crop pests*. CAB International, Wallingford.
- Decrouez, D.** 1993. Les collections du Département de géologie et de paléontologie du Muséum d'Histoire Naturelle de Genève — 47. La collection Lamarck. *Revue de Paléobiologie*, **12**(1): 311–323.
- Deshayes, G.P.** 1824–1837. *Description des coquilles fossiles des environs de Paris*. 2 volumes. Author, Paris.
- Deshayes, G.P. & Milne-Edwards, H.** 1838. *Histoire naturelle des animaux sans vertèbres*, Ed. 2, vol. 8 (Mollusques). 660 pp. Baillière, Paris.
- Estebenet, A.L.** 1995. Food and feeding in *Pomacea canaliculata* (Gastropoda: Ampullariidae). *The Veliger*, **38**: 277–283.
- Favre, J.** 1918. *Catalogue illustré de la collection Lamarck appartenant au muséum d'histoire naturelle de Genève*. 10, 12, 20 pp., 117 pls. Muséum d'Histoire Naturelle, Genève.
- Glibert, M.** 1933. Monographie de la faune malacologique du Bruxellien des environs de Bruxelles. *Mémoires du musée Royal d'histoire naturelle de Belgique. Verhandelingen van het Koninklijk Natuurhistorisch Museum van België*, **53**: 1–216.
- Glibert, M.** 1963. Les Mesogastropoda fossiles du cénozoïque étranger des collections de l'institut royal des sciences naturelles de Belgique, deuxième partie, Fossaridae à Ficidae (inclus). *Koninklijk Belgisch Instituut voor Natuurwetenschappen, Verhandelingen*, (2)**73**: 1–154.
- Halwart, M.** 1994. The golden apple snail *Pomacea canaliculata* in Asian rice farming systems: present impact and future threat. *International Journal of Pest Management*, **40**: 199–206.
- Hylton Scott, M.I.** 1958. Estudio morfológico y taxonomico de los ampullaridos de la Republica Argentina. *Revista del Museo Argentino de Ciencias Naturales 'Bernardino Rivadavia' e Instituto Nacional de Investigacion de las Ciencias Naturales, Ciencias Zoológicas*, **3**(5): 231–333.
- Kabat, A.R.** 1991. The classification of the Naticidae (Mollusca: Gastropoda): review and analysis of the supraspecific taxa. *Bulletin of the Museum of Comparative Zoology*, **152**: 417–449.
- Kobelt, W.** 1913. Die Gattung *Ampullaria*. In Küster, H.C., *Systematisches Conchylien-Cabinet von Martini und Chemnitz*. Neue Folge. 1(20) (Section 2), pp. 153–200, pls. 57–68. Baur & Raspe, Nürnberg.

- Lach, L., Britton, D.K., Rundell, R.J. & Cowie, R.H.** In press. Food preference and reproductive plasticity in an invasive freshwater snail. *Biological Invasions* (2001).
- Lamarck, J.B.P.A. de M. de.** 1804. Suite des mémoires sur les fossiles des environs de Paris. *Annales du Muséum National d'Histoire Naturelle*, **5**(25): 28–36.
- Lamarck, J.B.P.A. de M. de.** 1822a, 1822b. *Histoire naturelle des animaux sans vertèbres*, vol. 6, part 2. 232 pp. (1822a); vol. 7. 711 pp. (1822b). Author, Paris.
- Le Renard, J. & Pacaud, J.-M.** 1995. Révision des mollusques paléogènes du bassin de Paris. II — Liste des références primaires des espèces. *Cossmanniana*, **3**(3): 65–132.
- Mermod, G.** 1952. Les types de la collection Lamarck au Muséum de Genève. Mollusques vivants, 3. *Revue Suisse de Zoologie*, **59**(2): 23–97.
- Mochida, O.** 1988. The rice water weevil (*Lissorhoptus oryzophilus* Kuschel) and the freshwater snail (*Pomacea canaliculata* (Lamarck)) as important pests of crops for plant quarantine in Asia. *Asean Planti*, **1988**: 71–80.
- Naylor, R.** 1996. Invasions in agriculture: assessing the cost of the golden apple snail in Asia. *Ambio*, **25**: 443–448.
- Neck, R.W.** 1987. A second record of an introduced apple snail, *Pomacea canaliculata*, from the lower Rio Grande valley of Texas. *Texas Conchologist*, **23**(2): 54–57.
- Pacaud, J.-M. & Le Renard, J.** 1995. Révision des mollusques Paléogènes du Bassin de Paris. IV — Liste Systématique Actualisée. *Cossmanniana*, **3**(4): 151–187.
- Palmer, K. van W.** 1977. *The unpublished velvins of Lamarck. 1802–1809: Illustrations of the Paris Basin Eocene*. 67 pp., 28 pls. Paleontological Research Institute, Ithaca.
- Perera, G. & Walls, J.G.** 1996. *Apple snails in the aquarium*. 121 pp. T.F.H. Publications, Neptune City, New Jersey.
- Philippi, R.A.** 1851–1852. Die Gattung *Ampullaria*. In Küster, H.C., *Systematisches Conchylien-Cabinet von Martini und Chemnitz*. Neue Folge. 1(20). 74 pp., pls. A, 1–21. Baur & Raspe, Nürnberg.
- Pointier, J.-P.** 1975. Faune malacologique dulçaquicole de l'île de la Guadeloupe (Antilles françaises). *Bulletin du Muséum National d'Histoire Naturelle*, (3)**235** (Zoologie 159): 905–934.
- Reeve, L.** 1856–1858. *Conchologia Iconica: or, illustrations of the shells of molluscous animals*, vol. 10 (Monographs of the genera *Ampullaria* et al.). Reeve, London.
- Sowerby, G.B.** [3rd of the name] 1909. Notes on the family Ampullariidae, with list of species, varieties, and synonyms, also descriptions of four new species. *Proceedings of the Malacological Society of London*, **8**: 345–362.
- Thiengo, S.C., Borda, C.E. & Araújo, J.L.B.** 1993. On *Pomacea canaliculata* (Lamarck, 1822) (Mollusca; Pilidae: Ampullariidae). *Memorias do Instituto Oswaldo Cruz, Rio de Janeiro*, **88**(1): 67–71.
- Thompson, F.G.** 1997. *Pomacea canaliculata* (Lamarck, 1822) (Gastropoda, Prosobranchia, Pilidae): a freshwater snail introduced to Florida, U.S.A. *Malacological Review*, **30**: 91.
- Tracey, S., Todd, J.A., Le Renard, J., King, C. & Goodchild, M.** 1996. Distribution of Mollusca in units S1 to S9 of the Selsey Formation (middle Lutetian), Selsey Peninsula, West Sussex. *Tertiary Research*, **16**(1–4): 97–139.
- Vitousek, P.M., D'Antonio, C.M., Loope, L.L. & Westbrooks, R.** 1996. Biological invasions as global environmental change. *American Scientist*, **84**: 468–478.
- Wada, T.** 1997. Introduction of the apple snail *Pomacea canaliculata* and its impact on rice agriculture. Pp. 170–180, in: *Proceedings, international workshop on biological invasions of ecosystems by pests and beneficial organisms*. National Institute of Agro-Environmental Sciences, Ministry of Agriculture, Forestry and Fisheries, Tsukuba.
- Wenz, W.** 1941. Gastropoda, Teil 1 (Allgemeiner Teil und Prosobranchia), in Schindewolf, O.H. (Ed.), *Handbuch der Paläozoologie*, Band 6. Teil 5. Borntraeger, Berlin.